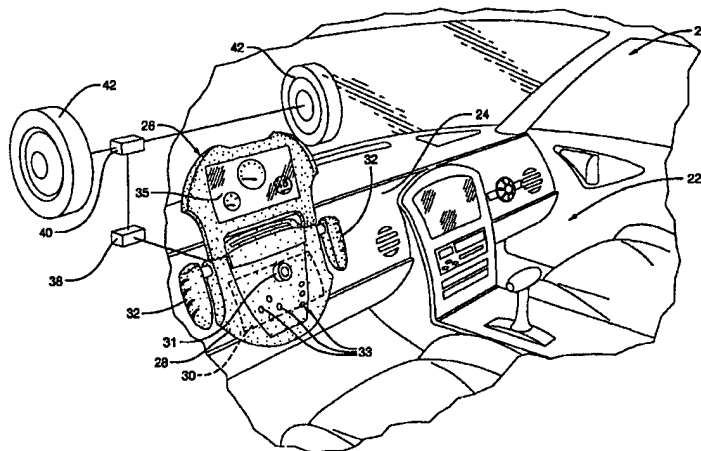




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US99/29102 <b>(22) International Filing Date:</b> 8 December 1999 (08.12.99) <b>(30) Priority Data:</b> 60/111,460 9 December 1998 (09.12.98) US <b>(71) Applicant:</b> DELPHI TECHNOLOGIES, INC. [US/US]; Legal Staff - Mail Code: 480-414-420, P.O. Box 5052, Troy, MI 48007-5052 (US). <b>(72) Inventors:</b> KWON, Ki, C.; 914 Colebrook, Troy, MI 48083 (US). DYBALSKI, Ronald, Henry; 4510 Elmhurst Avenue, Royal Oak, MI 48073 (US). BROOKS, Vincent, Lee; 2019 Main Street #109, Royal Oak, MI 48073 (US). <b>(74) Agent:</b> MARRA, Kathryn, A.; Delphi Technologies, Inc., Legal Staff, P.O. Box 5052, Mail Code: 480-414-420, Troy, MI 48007-5052 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, BA, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GE, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

**(54) Title:** A VEHICLE STEERING COMMAND MODULE WITH AN ADJUSTABLE STEERING RIM DIAMETER

**(57) Abstract**

A vehicle steering command module (26) is disclosed that is removably connectable to a vehicle (20). The vehicle steering command module (26) includes a housing (28), a computer (30) disposed within the housing (28), and a plurality of adjustable handles (32) connected to the housing (28) for directing motion of the vehicle (20). The vehicle steering command module (26) adjusts the direction of vehicle travel via a steer by wire system. Preferably, there are two adjustable handles (32) connected to the housing (28). The handles (32) are adjustable between a retracted position and a plurality of extended positions to allow a user to select a preferred diameter between the handles (32). Further, each handle (32) preferably includes an electronic turn signal switch (34). The computer (30) includes an input device (31, 33, 52). The input device (31, 33, 52) is disabled when the vehicle steering command module (26) is connected to the vehicle (20) and the handles (32) are in one of the extended positions.

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## A VEHICLE STEERING COMMAND MODULE WITH AN ADJUSTABLE STEERING RIM DIAMETER

This application claims the benefit of U.S. Provisional  
Application No. 60/111460, filed December 9, 1998.

### TECHNICAL FIELD

This invention relates to a vehicle steering command module  
that has an adjustable steering rim diameter, is detachable from a vehicle's  
instrument panel and capable of being used as a personal computer when  
5 detached from the instrument panel.

### BACKGROUND OF THE INVENTION

Steering wheels are well known in motor vehicles to provide a  
way for a driver of the vehicle to change the vehicle's direction of travel.  
10 Typically, a series of mechanical gears connect the steering wheel to the  
vehicle's front wheels. Movement of the steering wheel causes the mechanical  
gears to interact, thus, causing the wheels to turn in the desired direction and  
to the desired amount.

Typically, known steering wheels have a fixed steering rim  
15 diameter with a circular grip around an outer diameter. The driver uses the  
grip to rotate the steering wheel and change the vehicle's direction of travel.  
A disadvantage of having a fixed diameter is that not all drivers are the same  
size or have the same arm length. Therefore, smaller drivers with shorter  
arms would prefer a steering wheel with a smaller diameter. On the other  
20 hand, drivers with longer arms would prefer a steering wheel with a larger  
diameter.

Therefore, it is desirable to provide a vehicle steering command  
module having an adjustable steering rim diameter. Such a system would  
allow the user to select a preferred diameter.

## SUMMARY OF THE INVENTION

The present invention provides alternatives and advantages over the prior art by providing a vehicle steering command module that includes handles forming an adjustable diameter steering rim to control the direction of vehicle travel wherein the module is removably connectable to the vehicle.

5 The vehicle steering command module includes a housing, a computer disposed within the housing, and a plurality of adjustable handles connected to the housing. The handles are movable between a retracted position and a plurality of extended positions. Preferably, the vehicle steering control

10 module connects to the vehicle's instrument panel.

There are preferably two adjustable handles connected to the housing to aid in directing the motion of the vehicle. Preferably, there are at least two extended positions. Further, a turn signal is connected to each adjustable handle.

15 There are preferably a series of input devices that communicate with the computer. The input devices may comprise a keyboard, control buttons, or a mouse. When the vehicle steering command module is detached from the instrument panel, the input devices are enabled. The input devices are also enabled when the vehicle steering command module is attached to the

20 instrument panel and the handles are in the retracted position. However, a built-in safety feature of the module is that, once the handles are moved into an extended position when the vehicle steering command module is attached to the instrument panel the input devices are disabled.

A steer by wire system controls the direction of vehicle travel.

25 The computer communicates with a controller and the controller communicates with an actuator. The computer senses a change in position of the housing and sends a signal to the controller. The controller, in turn, signals the actuator to adjust the direction of vehicle travel.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a vehicle interior including a vehicle steering command module attached to an instrument panel according to the present invention;

Figure 2 is a perspective view of a vehicle steering command module with the handles in the retracted position.

Figure 3A is a rear view of a vehicle steering command module with a motor for adjusting the position of the handles.

Figure 3B is a rear view of a vehicle steering command module with a latch for adjusting the position of the handles.

Figure 4 is a front view of a vehicle steering command module with turn signal switches positioned on the handles.

Figure 5 is a front view of a vehicle steering command module with the doors swung open revealing a keyboard.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 1, a vehicle 20 includes a vehicle interior 22 having an instrument panel 24 extending transversely across the vehicle interior 22 between the sides of the vehicle 20. The vehicle steering command module, shown generally at 26, removably connects to the vehicle's instrument panel 24.

The steering vehicle command module 26 includes a housing 28, a computer 30 disposed within the housing 28, and preferably two adjustable handles 32 for controlling the direction of vehicle travel. Preferably, the handles 32 contain texturing to prevent the driver's hands from slipping off of the handles 32. The housing 28 includes a port 29 (see Figures 3A and 3B) that connects to a corresponding port (not shown) on the instrument panel 24 of the vehicle 20. The computer 30 has at least one input device. The input device may comprise a keyboard, control buttons, or a

mouse as is known in the art. The input devices shown in Figure 2 include a mouse 31 and control buttons 33. The steering vehicle command module 26 also preferably includes a flip-up flat display screen 35, shown in an up position in Figure 1. The display screen 35 displays a variety of information  
5 to the driver.

A steer by wire system controls the motion of the vehicle 20. The vehicle steering command module 26 is operably connected to a controller 38 that communicates with the computer 30 and with an actuator 40. The actuator 40 is operably connected to at least one of the vehicle's wheels 42.  
10 The actuator 40 controls rotation of the at least one wheel 42 to alter the direction of vehicle travel. When the driver of the vehicle 20 wants to change the direction of the vehicle's travel, the driver uses the handles 32 to rotate the vehicle steering command module 26. The movement of the housing 28 causes a signal to be sent from the computer 30 to the controller 38 regarding  
15 the desired direction of vehicle travel. The controller 38, in turn, sends a signal to the actuator 40 and the actuator 40 adjusts the direction of vehicle travel.

A tilt device 36, shown in Figure 2, is an optional component of the vehicle steering command module 26. The housing 28 releasably  
20 connects to the tilt device 36 and the tilt device 36 releasably connects to the instrument panel 24. The tilt device 36 allows the housing 28 to move between a plurality of tilt positions.

As shown in Figures 1 and 2, the handles 32 are adjustable from a retracted position (see Figure 2) to at least one extended position (see  
25 Figure 1). Preferably the handles 32 adjust between a plurality of extended positions so a user can select a preferred diameter.

As shown in Figure 3A, the adjustable handles 32 are preferably operably connected to a motor 44 that allows movement of each handle 32 between the retracted position and the extended positions. The  
30 motor 44 also allows the handles 32 to remain secured in a desired position. Preferably, each handle 32 is connected to an extension rod 46 and each

extension rod 46 is operably connected to the motor 44. The extension rods 46 are guided along guide rails 48 that are attached to the housing 28. Preferably, the guide rails 48 and the motor 44 are positioned within the housing 28.

5                   Alternatively, as shown in Figure 3B, a latch mechanism 50 is operably connected to each adjustable handle 32 to allow movement of each handle 32 between the retracted position and the extended positions. Preferably, each handle 32 is connected to an extension rod 46 and each extension rod 46 is operably connected to the latch mechanism 50. The latch  
10                   mechanism 50 also secures the handles 32 in a desired position. The latch 50 is movable between a latched and an unlatched position. The handles 32 are movable between the retracted position and one of the extended positions when the latch 50 is in the unlatched position. The handles 32 are secured at the retracted position or one of the extended positions when the latch is in the  
15                   latched position.

Any type of latch mechanism 50 known in the art could be used. For example, the latch mechanism could include at least one projection and the extension rods contain a plurality of holes for receiving the latch mechanism projection to secure the handles in a desired position.

20                   There is also preferably a turn signal switch 34 connected to each of said two adjustable handles 32, as shown in Figure 4. Preferably, the turn signal switch 34 is an electronic switch having a timing unit. Alternatively, the turn signal switch 34 is a self-canceling toggle switch.

Figure 4 shows an alternative embodiment of the vehicle  
25                   steering command module. A keyboard 52 is covered by several doors 54 that can swing open. The doors 54 are shown in the closed position in Figure 4 and in the open position in Figure 5. The keyboard 52 and the mice 31 can be used as input devices. There is also a flat flip-up display screen 35 connected to the housing 28 that is shown in the up position.

30                   When the steering vehicle control module 26 is not connected to the instrument panel 24, the vehicle 20 will not start. However, the input

devices 31, 33, 52 are enabled. When the steering vehicle control module 26 is connected to the instrument panel 24, either directly or through the tilt device 36, the vehicle 20 will start. Once connected to the instrument panel 24, if the handles 32 are in the retracted position the input devices 31, 33, 52  
5 remain enabled. As a safety feature, when the adjustable handles 32 are secured in any of the extended position, the input devices 31, 33, 52 become disabled.

While the present invention has been described as carried out in specific embodiments thereof, it is not intended to be limited thereby but is  
10 intended to cover the invention broadly within the scope and spirit of the appended claims.

## CLAIMS

1. A vehicle steering command module (26) removably connectable to a vehicle (20) for controlling the direction of travel of the vehicle (20), the vehicle steering command module (26) comprising:

a housing (28);

5 a computer (30) disposed within said housing (28); and

a plurality of adjustable handles (32) connected to said housing (28), rotation of said housing (28) controlling the direction of travel of the vehicle (20) when said vehicle command module (26) is connected to the vehicle (20).

10

2. The vehicle steering command module (26) of claim 1 wherein there are two of said adjustable handles (32), said adjustable handles (32) opposite each other.

3. The vehicle steering command module (26) of claim 2 wherein said two adjustable handles (32) are movable between a retracted position and at least one extended position.

4. The vehicle steering command module (26) of claim 3 further comprising a latch (50) movable between a latched and an unlatched position; each of said handles (32) movable between said retracted position and said at least one extended position when said latch (50) is at said unlatched position; and said handles (32) secured at said retracted position or said at least one extended position when said latch (50) is at said latched position.

5. The vehicle steering command module (26) of claim 3 further comprising a motor (44) operably connected to each of said handles (32); said motor (44) moving and securing said handles (32) between said retracted position and said at least one extended position.

5

6. The vehicle steering command module (26) of claim 1 wherein a turn signal switch (34) is connected to each of said adjustable handles (32).

7. The vehicle steering command module (26) of claim 6 wherein each of said turn signal switches (34) is an electronic switch having a timing unit.

8. The vehicle steering command module (26) of claim 6 wherein each of said turn signal switches (34) is a self-canceling toggle switch.

9. A vehicle steering command module (26) releasably connected to a vehicle (20) for controlling the direction of vehicle travel, said vehicle steering command module (26) comprising:

- 5           a housing (28) releasably connected to said vehicle (20);  
          a computer (30) disposed within said housing (28); and  
          a plurality of handles (32) connected to said housing (28),  
rotation of said housing (28) controlling the direction of travel of said vehicle  
(20), said handles (32) adjustable between a retracted position and at least one  
extended position.

10

10. The vehicle steering command module (26) of claim 9  
wherein there are two of said adjustable handles (32).

11. The vehicle steering command module (26) of claim 9  
further comprising a latch (50) movable between a latched and an unlatched  
position; each of said handles (32) movable between said retracted position  
and said at least one extended position when said latch (50) is at said unlatched  
5   position; and said handles (32) secured at said retracted position or said at  
least one extended position when said latch (50) is at said latched position.

12. The vehicle steering command module (26) of claim 9  
further comprising a motor (44) operably connected to each of said handles  
(32); said motor (44) moving and securing said handles (32) between said  
retracted position and said at least one extended position.

5

13. The vehicle steering command module (26) of claim 9 wherein a turn signal switch (34) is connected to each of said adjustable handles (32).

14. The vehicle steering command module (26) of claim 13 wherein each of said turn signal switches (34) is an electronic switch having a timing unit.

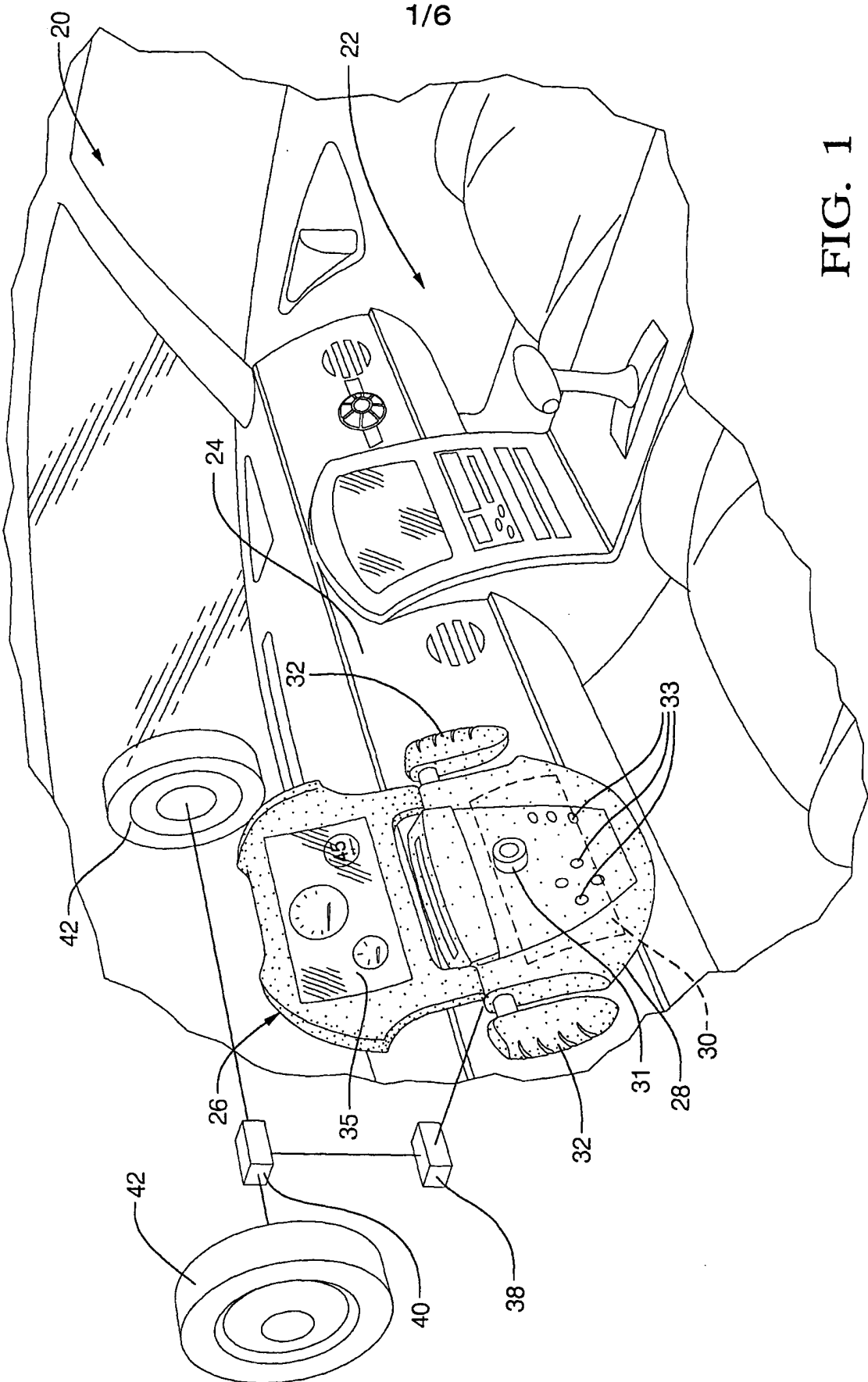
15. The vehicle steering command module (26) of claim 13 wherein each of said turn signal switches (34) is a self-canceling toggle switch.

16. The vehicle steering command module (26) of claim 9 further comprising a tilt device (36) removably connectable to said vehicle (20) and said housing (28), said tilt device (36) allowing said housing (28) to move between a plurality of tilt positions.

5

17. The vehicle steering command module (26) of claim 9 further comprising an input device (31, 33, 52) communicating with said computer (30), wherein when said housing (28) is connected to said vehicle (20) and said handles (32) are in one of said extended positions, said computer input device (31, 33, 52) is disabled.

5



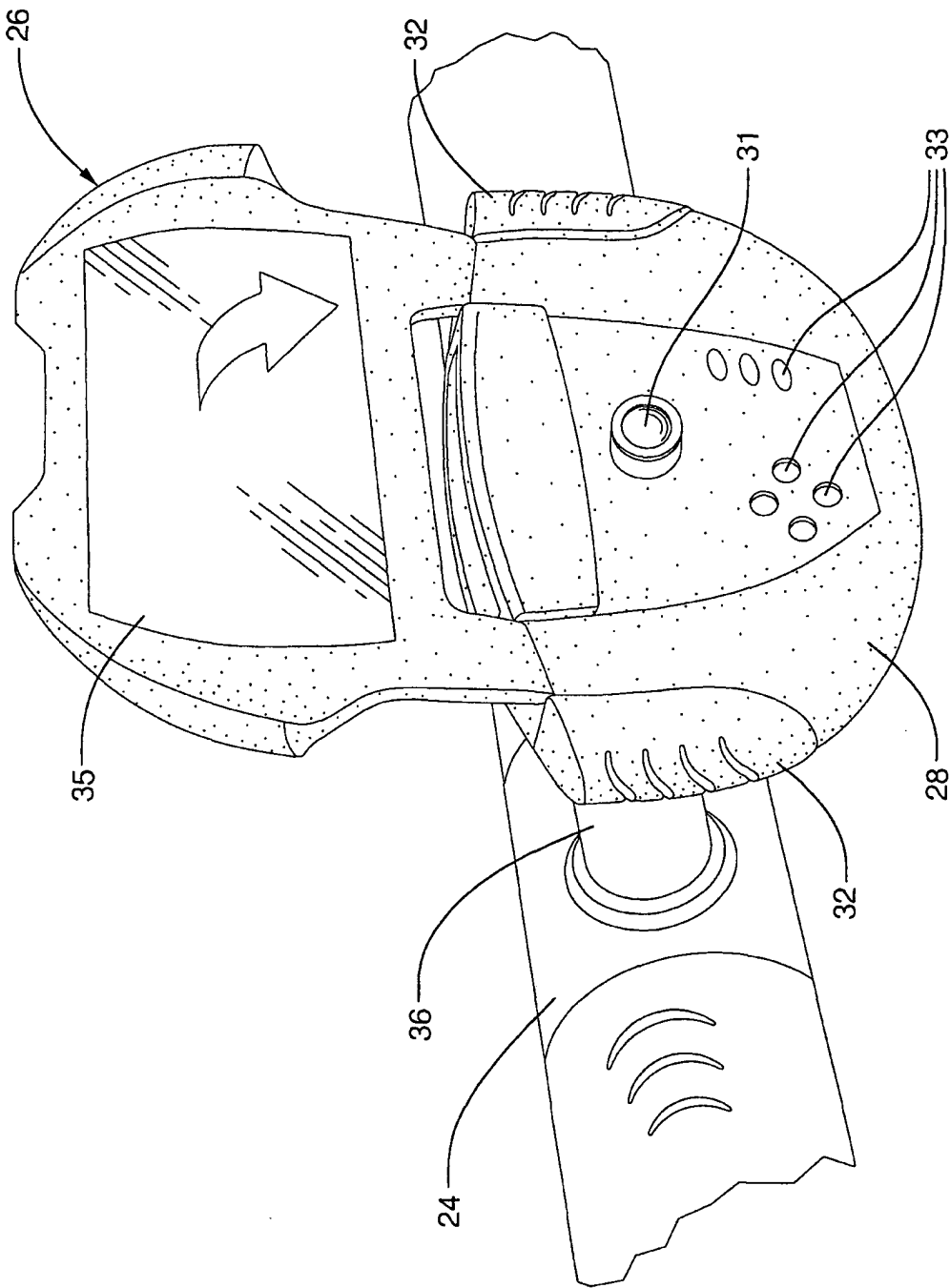


FIG. 2

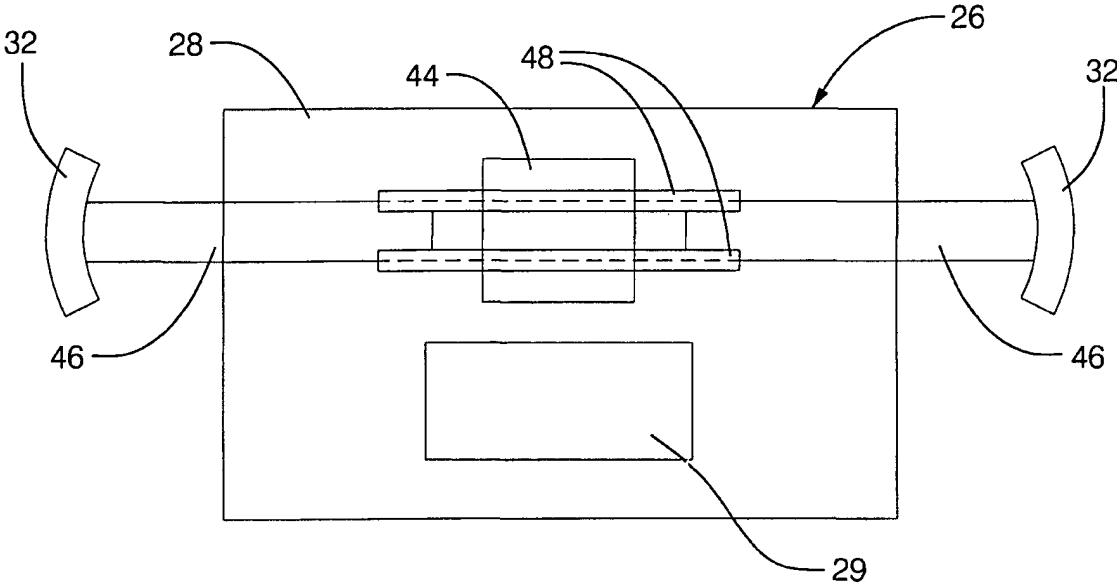


FIG. 3 A

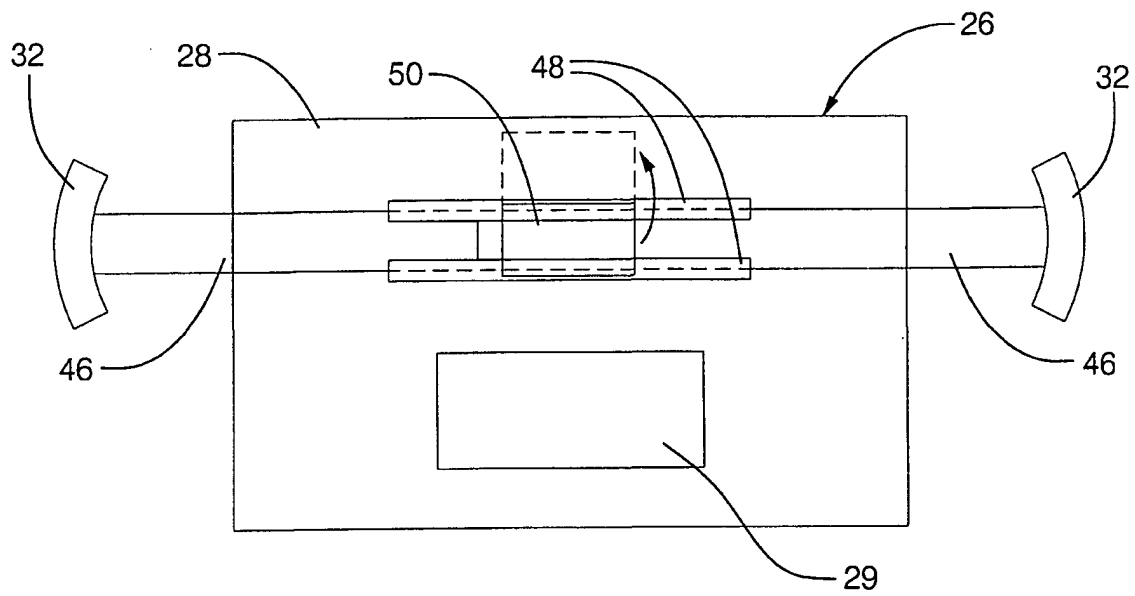


FIG. 3 B

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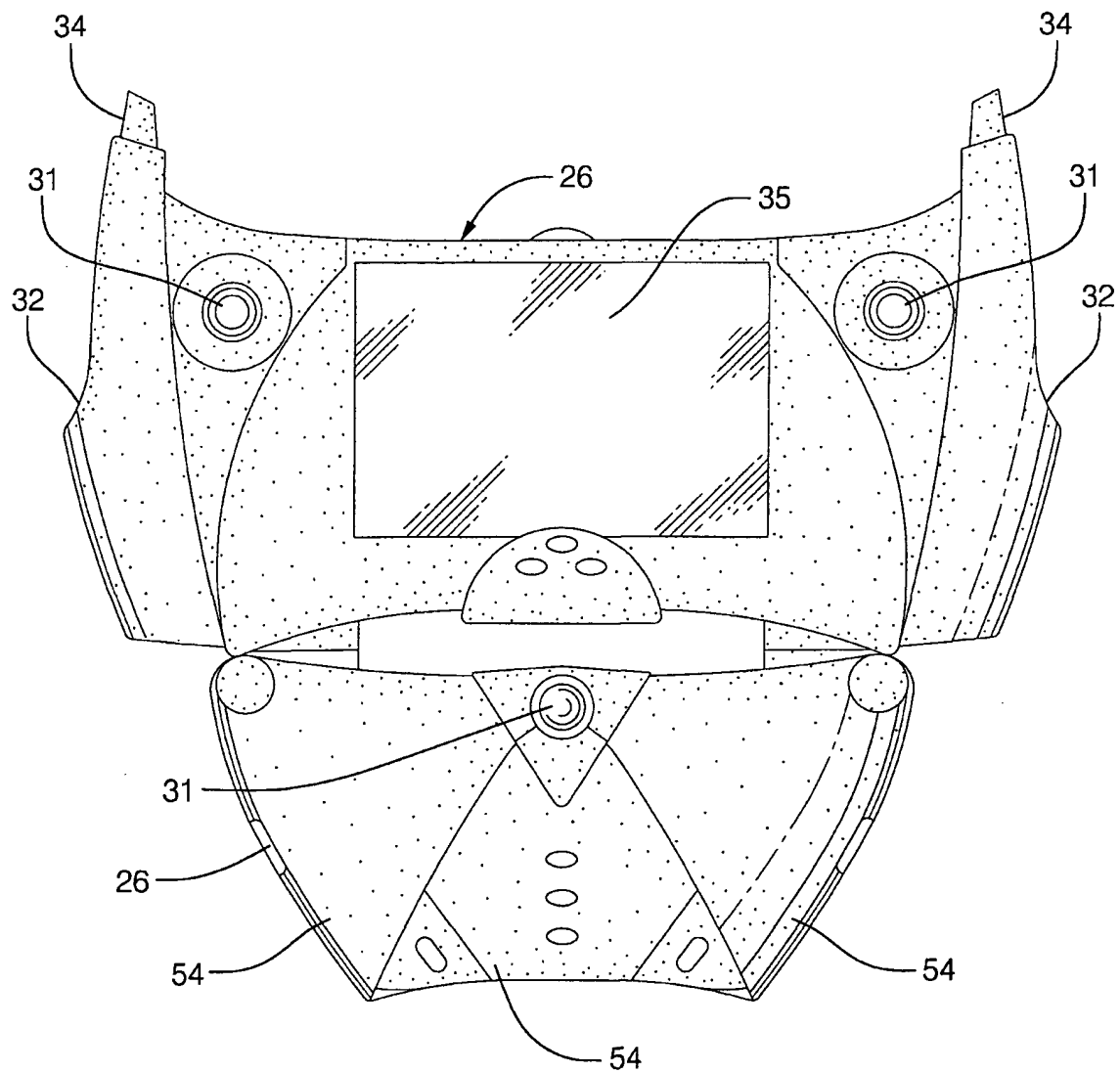


FIG. 4

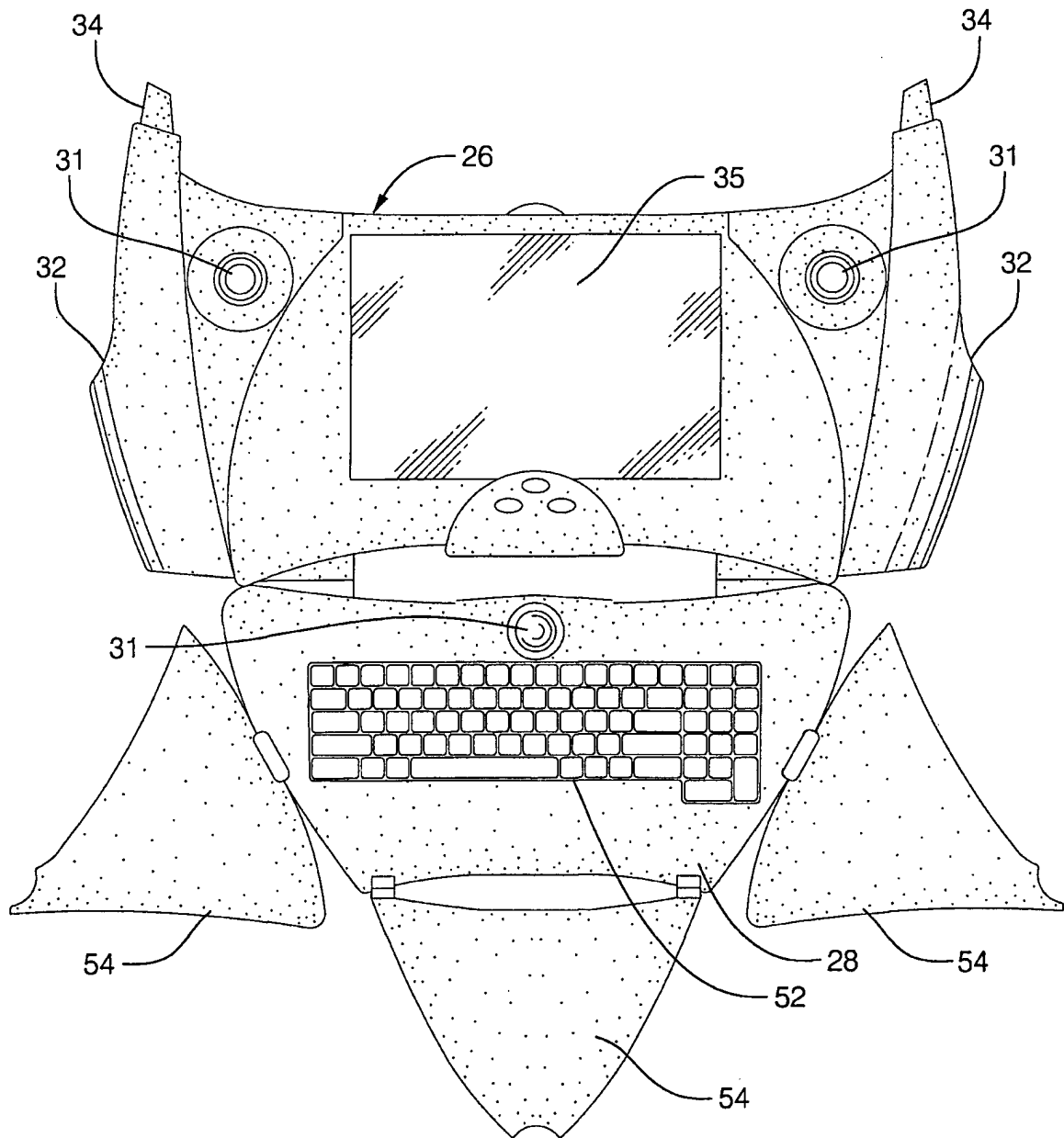


FIG. 5

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 99/29102

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B62D1/06 B60K35/00 B60R16/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B62D B60K B60R G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US T875019 I (CHARLES J. HADDAD, ROBERT W. RILEY, RICHARD O. SCOTT) 23 June 1970 (1970-06-23) the whole document	1-4,9-11
A	DE 42 28 605 A (BLAUPUNKT WERKE GMBH) 3 March 1994 (1994-03-03)	1,9,17
A	PATENT ABSTRACTS OF JAPAN vol. 011, no. 247 (M-615), 12 August 1987 (1987-08-12) & JP 62 055263 A (MAZDA MOTOR CORP), 10 March 1987 (1987-03-10) abstract figures 1,2,8	1,2,6,9, 13
	-/-	

☒ Further documents are listed in the continuation of box C.

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A	<p>US 2 455 887 A (J. J. BRAUDE) 7 December 1948 (1948-12-07) column 1, line 52 -column 2, line 44; figures</p> <p>-----</p>	16

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/29102

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US T875019 I	23-06-1970	NONE	
DE 4228605 A	03-03-1994	NONE	
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US 2455887 A	07-12-1948	NONE	